INFLUENCE OF THE SEA ON THE CLIMATE OF LONG ISLAND, N. Y.

By ERNEST S. CLOWES.

[Dated: Bridgehampton, Long Island, N. Y., May 4, 1917.]

The influence of the sea on climate has been known in every age, and has been studied by meteorologists in all its manifestations from the monsoon winds of India to sea breezes of our northern coasts; but I doubt if it be generally known that right at our own doors lies a field for study in this direction that presents many interesting possibilities.

Long Island, N. Y., extends from New York Harbor, a distance of 125 miles in an east-northeast direction. For about 70 miles it averages 12 miles wide, the eastern 45 miles forms two peninsulas, the southern one the longer and divided from the northern by a series of irregular bays. On the north the waters of Long Island Sound, averaging 10 to 12 miles wide, lie between it and the Connecticut shore. The southern coast is almost straight and runs in a direction nearly parallel with the prevailing westerly winds. The effect of the sea, especially in Summer, is therefore at its maximum value, for a relatively slight difference in air densities over the land and the adjacent waters is sufficient to deflect the prevailing wind in either direction. The effect of the sea breeze is therefore more marked than in most situations on either the Atlantic or Pacific coasts. The most interesting feature of all this is the notable influence on temperature of relatively small distances from the sea or the Sound. For purposes of illustration I give below the average maxima and minima for the summer months at four different locations on Long Island, as well as at New York City. All but Mecox are from the records of United States Weather Bureau voluntary observers. The Mecox record was made by the author with a Draper recording thermometer placed in a well-ventilated, covered porch with a southwest exposure and protected from the direct rays of the sun at all times, except one or two hours in late afternoon in the latter part of the summer and for which due allowance has been made.

TABLE 1.—*Mean maximum and minimum temperatures, 1912–1916, inclusive.*

Stations.	Distance from sea.	July.		August.		September.	
		Max.	Min.	Max.	Min.	Max.	Min.
	Miles.	°*F.*	°*F.*	°*F.*	°*F.*	°*F.*	°*F.*
Mecox	0.25	73.1	62.5	73.9	62.9	70.1	57.5
Southampton[1]	2	77.8	61.4	77.2	60.8	72.2	54.9
Cutchogue[1]	12	80.4	62.7	79.5	62.1	75.6	56.4
Setauket[2]	17	79.8	63.5	78.3	62.9	72.3	56.8
New York City	10	81	66	80	65	74	59

[1] Is 2 miles from Long Island Sound. [2] Is a quarter mile from Long Island Sound.

Of the Long Island stations, the one nearest the ocean, Mecox, has by far the lowest mean maximum, and, with the exception of Setauket, the highest mean minimum, the average difference from Setauket being probably less than the probable error of observation. The maxima increase quite regularly according to the distance from deep water. The maxima for Setauket seem high for its short distance from the Sound, but this is explained by its greater distance from the ocean which is the principal factor. For the years 1914–1916, inclusive, a station has been maintained at Medford about in the geographic center of the island and 7 miles or more from ocean or sound. These records indicate a maximum higher than Setauket and about equal to New York, and a low minimum about equal to Southampton. A map of the average July maxima for Long Island probably would show, along the south shore, at least 5 isotherms of 1 degree within a distance of as many miles, a rather remarkable result when it is considered that on the continent such isotherms are usually 60 or 70 miles apart.

The marine influence on the minima is also noticeable, though not to the same degree. For the three summer months Southampton is the lowest, Medford (probably) next, and Mecox, Cutchogue, and Setauket following in the order named. At first sight this seems contradictory as Southampton, 2 miles from the sea, has a lower minimum than Setauket, which is about 17 miles. This is due to the configuration of the land and the prevailing winds which at night, especially in hot weather, are west or northwest. This is sufficient on the north side of the island to overcome any tendency toward a local land breeze at night blowing toward the north, while on the south side of the island it falls in with a tendency toward a land breeze there. The result is that Setauket on the north side, getting the night wind off the Sound, has the highest minimum; Cutchogue comes next and Southampton, which is far removed from the Sound, has the lowest figures. The case of Mecox seems to form an exception, as it is one quarter mile from the ocean and 12 or 14 miles from the Sound, and yet has a minimum nearly as high as Cutchogue.

This is, I think, explained somewhat on the same lines as Seeman's theory of the sea breeze. He held the sea breeze began several miles out to sea because the warm air over the land expanded and acted as a wall against which the incoming breeze could not at first make headway. Similarly, after days when the sea breeze dies at sunset and the land quickly cools by radiation, the air over it shrinks and a sort of false sea breeze, very light compared with the daytime breeze and seldom extending half a mile inland, sets in. It has been the writer's frequent experience to ride at night from the village of Bridgehampton, 2 miles or so inland, when the evening was still, damp, and chilly and low places filled with land fog, down to the coast and to feel about half a mile from the shore a relatively warm, dry air from the sea and no fog about. This effect is specially noticeable late in the summer, and it may be noted that for August the minimum for Mecox is actually higher than Cutchogue and equaling Setauket, while for September it is higher than either and the highest on Long Island. Another possible explanation with regard to Setauket and Cutchogue may be that their high minima may be due to the same reason that New York's is due—that is, to a high average temperature, but the figures for Mecox seem to disprove this in part.

Whatever the explanation, the isotherms of Long Island, especially in summer, might furnish material for further study in which the factors of marine influence on climate might be examined on a small but informing scale.